

## PATENT COOPERATION TREATY

03 DEC 2004

## PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference TS 1042 PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/05962	International filing date (day/month/year) 05.06.2003	Priority date (day/month/year) 05.06.2002
International Patent Classification (IPC) or both national classification and IPC C10G2/00		
Applicant SHELL INTERNATIONALE RESEARCH MAATS... et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

EPO - DG 1  
15. 10. 2004

Date of submission of the demand 30.12.2003	Date of completion of this report 10.09.2004
Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Falls, F Telephone No. +49 89 2399-8350 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP 03/05962

**I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-12 as originally filed

**Claims, Numbers**

1-6 received on 12.05.2004 with letter of 12.05.2004

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

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**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 6

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

see separate sheet

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-5
	No: Claims	
Inventive step (IS)	Yes: Claims	1-5
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-5
	No: Claims	

**2. Citations and explanations**

see separate sheet

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/05962

**1). Prior Art**

**US-A-2243869(D1)** discloses a light HC gas subjected to partial oxidation to produce syn gas which is converted to liquid and gaseous HCs, followed by separation of these (Cl. 2). The lighter HCs ( $C_2$ - $C_4$ ) are also separated from hydrogen, nitrogen, CO and  $CO_2$  (pg 3, RH col. I. 64-70) with further separation of nitrogen and  $CO_2$  from the latter to give a stream for recycling which is depleted in  $CO_2$  (pg 4, LH col. I. 2-36). A Co-based FT catalyst is also disclosed (pg 2, RH col. I. 48-60).

**NL-A-8303911(D2)** discloses production of higher HCs from light HCs by partial oxidation to syngas which is then subject to FT synthesis using a catalyst of Co on a support of alumina, silica or silica-alumina which has Zr present as a promoter.

**2). Novelty (Art. 33(2) PCT).**

Neither D1 nor D2 disclose that the catalytic FT synthesis is carried out using Co on a zirconia carrier.

**3). Inventive Step (Art. 33(3) PCT)**

The presence of an inventive step is established by the results provided by the applicant with his letter of reply in which it is established that replacing the more conventional supports of silica and titania with zirconia leads to a substantial increase in the yield of  $C_{11}$ - $C_{14}$  olefins. It is not considered that the use of Zr as a promoter in D2 would suggest to the skilled person to use zirconia as a promoter.

**II**

The application also fails to meet the requirements of the PCT convention in the following respects.

1). Claim 6 does not meet the requirements of Art. 6 PCT since its feature is a result to be achieved.

2). Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art

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International application No. PCT/EP 03/05962

disclosed in the documents D1 and D2 are not mentioned in the description, nor are  
these documents identified therein.

12-05-2004

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TS 1042

C L A I M S

1. Process for the production of hydrocarbons from gaseous hydrocarbonaceous feed comprising the steps of:

- i). partial oxidation conversion of the gaseous hydrocarbonaceous feed and oxygen containing gas at elevated temperature and pressure into synthesis gas;
- ii). catalytical conversion of synthesis gas of step i) using a cobalt on zirconia carrier based Fischer-Tropsch catalyst into a hydrocarbons comprising stream;
- iii). separating the hydrocarbons comprising stream of step ii) into a hydrocarbons product stream and a recycle stream; and
- iv). removing carbon dioxide from the recycle stream and recycle of carbon dioxide depleted recycle stream to step i).

2. Process as claimed in claim 1, wherein the carbon dioxide depleted recycle stream is premixed with the gaseous hydrocarbonaceous feed.

3. Process as claimed in claim 1 or 2, wherein part of the recycle stream of step iii) is used as fuel in steam reforming of gaseous hydrocarbonaceous feed for producing hydrogen supplement for synthesis gas of step i).

4. Process as claimed in claims 1-3, wherein part of the recycle stream of step iii) or step iv) is used as fuel for power generation.

5. Process as claimed in claim 1-4, wherein the hydrocarbons product stream is subjected to catalytic hydrocracking.

6. Process as claimed in claim 1-5, wherein the hydrocarbon product stream comprises between 17 and 27 wt% C<sub>10</sub>-C<sub>14</sub>, preferably between 22 and 27 wt%.

AMENDED SHEET

BEST AVAILABLE COPY